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ABSTRACT

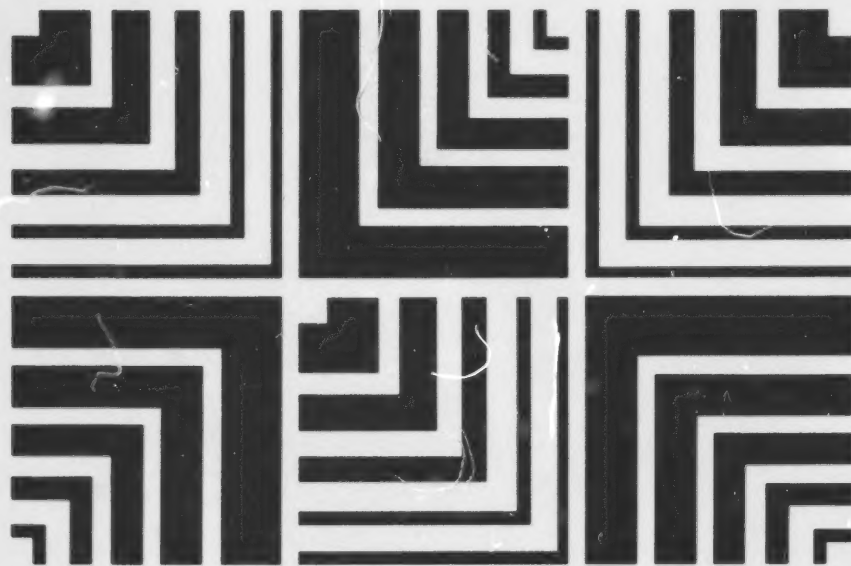
This report describes a strategy for planning vocational education. Discussed first are areas comprising the context for planning vocational education, including the relationship between education and work, the dimensions and stages of work adjustment, and the mission and performance requirements of vocational education (with attention to desired ends, limited work roles, relevance, concern for the individual, equal educational opportunity, time, available resources, technology, planning, and efficiency). The following variables/components of a model of vocational education are examined: vocational education as a process, the individual's life and work roles and vocational education, the changing nature of the individual's role, the technology of vocational education, society's functions and vocational education, resources for vocational education, alternatives to vocational education, cultural values and vocational education, and information and vocational education. Aspects of a theoretical strategy for planning vocational education are explained, including assigning value to society's and the individual's needs, determining present and desired levels of mutual satisfaction, defining alternative changes to get from the present to the desired state of affairs, and the cost of alternative changes. Also provided are operational strategies for very long range, long range, and short term educational planning. (MN)

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TOWARDS A STRATEGY FOR PLANNING VOCATIONAL EDUCATION

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PREFACE

The drafting of this report was formally initiated about seven years ago -- it remains to be seen whether the process of aging has had the same effect on the report as it does on fine wine or good beef. During this period the report has gone through many revisions and extensions. It has served as one of the bases for the direction taken in the program of research related to planning vocational education being conducted by the Minnesota Research and Development Center for Vocational Education. The thinking presented in the report has been evaluated through a variety of means -- workshops using simulated planning problems with education planners in Minnesota and other states, a review of literature on planning in vocational education, a national symposium on planning and vocational education, graduate and undergraduate classes in planning vocational education taught at the University of Minnesota, designing information systems to support the planning of vocational education and direct interaction with those who tackle planning problems on a day to day bases at the national, state and local level in vocational education.

The publication of this report at this time is for the purpose of exposing it to broader examination and critique rather than any thought that it constitutes the "final word". The title of this report begins with the word "towards" as a way to indicate my intent -- that this report serve as a means or stimulus towards improving the planning process for vocational education and thereby, the service vocational education might provide for its students and society in general.

I wish to thank the many workshop participants, students and colleagues who have provided me with special insights about planning vocational education which have found their way into this work. For you, the readers, I encourage critical comment.

ABSTRACT

The purpose of this report is to describe a strategy for planning vocational education. The strategy is evolved from positions taken concerning the context within which vocational education presently operates. From this context, a model of vocational education is developed for use in guiding thinking about the process of planning. Using this model which attempts to identify key factors and relationships which need to be considered, a strategy for planning vocational education is posited. The strategy is first addressed rather theoretically (ideally in terms of needed information and flexibility in providing vocational education) and then in terms of how the strategy might actually operate given more limited information and flexibility. Hopefully the proposed strategy will serve as a bases for discussion and action towards improving the planning of vocational education.

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Chapter I. CONTEXT FOR PLANNING VOCATIONAL EDUCATION

A definition of context makes explicit the assumptions and, there in, the limitations of a plan. Context provides a picture of "where you are coming from." It points out the structure imposed on the environment, the historical information considered important, and the values judged as prevailing. The paragraphs which follow provide a description of the context of vocational education, particularly as it relates to planning, which was used as a basis for later chapters dealing with a model of vocational education, and an evaluation of the model and strategy.

EDUCATION AND WORK

The need for education for work is best rationalized from a perspective of the context of work and education in our culture.¹ The initial assumption is that there is continuous interaction between the individual and society (all individuals as a group). Self actualization of each individual (reaching his/her full potential) and of society (reaching its best shared way of life - culture) are the most desirable outcomes of these interactions.

A society requires certain functions be conducted to maintain and improve its culture. These functions can be categorized as economic (production, processing and distribution of goods and services and the consumption of these goods and services), kinship (reproduction and child care), associational (social and leisure), political (governance), and religious (morale responsibility). Society prescribes roles for individuals in which to carry out these functions necessary to maintain and improve the culture. These roles provide the contexts within which the individuals interacts with society and through which he or she, as well as

¹The statements which follow in this sub-section are taken wholly or in part from Moss, J. Jr., Smith, B. B., & Copa, G. H. Some major concepts in a rationale for education for work (Career education). Unpublished manuscript. 1972.

society, may self-actualize. The degree to which an individual or society self-actualizes is, therefore, dependent on the extent to which the individual and society can actualize in each of these roles. Self-actualization of an individual can be estimated by the satisfaction of the individual with a given role. Contribution to the shared way of life (culture) is the measure of society's self-actualization and can be estimated by society's satisfaction with the individual's performance in the role. Individual and societal satisfaction with a role can be enhanced by altering: (a) cultural values, (b) role requirements and context, or (c) individual's behaviors and response potential.

Work

In this structure of the environment, "work" is the role prescribed by society for the individual to carry out the economic function of producing, processing, and distributing goods and services. Work is defined as the purposeful activities of an individual which produce, process, or distribute goods and services and which are intended to result in immediate wage earnings or income savings for the individual or his assigns. With this definition, work is tied to income, either as immediate earnings or indirectly through income saving (i.e., the homemaker is working when he/she is doing things that otherwise would have to be hired done as is the individual who fixes his/her own automobile -- these activities result in income saving). Further, an individual is working even if he/she does not directly earn the income (or save income) when the earnings are assigned to another person (i.e., as the case of the volunteer worker or the children cutting the lawn for parents -- the income saving in both cases is being assigned to someone else and by the proposed definition, these individuals are working). Work is important to society because it provides the economic production necessary to support its culture. It is important to the individual because it provides income necessary to support his/her "quality of life" plus providing an activity which may be satisfying to the individual in and of itself. "Occupation" is an abstraction which describes the expected behaviors of a similar set of work roles.

Education

Education is perceived as a planned, organized learning experience, directed at making individuals aware of their response potential in a role or altering the role behaviors of an individual in a manner which will

facilitate interaction and result in fuller self-actualization of the individual and society. A reasonable conclusion from an efficiency perspective is that society will advance education for those roles which are likely to result in the greatest increment in individual and societal satisfaction and which can be learned most efficiently by planned, organized means.

Society advances education for work because: (1) work is a role which society perceives to be so important to its maintenance and improvement that it cannot be left to haphazard means and (2) because it is efficient in view of the large number of individuals who must be so educated and the types of behaviors involved. Education for work is the societal mechanism for providing planned learning experiences designed to influence the behavioral capabilities and motivational awareness of the individual in his or her work role. The terminal goal of education for work is to enhance the mutual satisfaction of the individual and society through the individual's participation in the work role. The individual can receive satisfaction from the job content (i.e., the tasks one does on-the-job -- makes butt welds, teaches children, types letters) and the job context (i.e., the environment of the job -- wages, co-workers, fringe benefits, working conditions) while society receives satisfaction from the workers performance (i.e., production quantity and quality -- welds, educated children, letters) and the relevance of the job to society's needs (i.e., number of positions available and criticalness of positions to optimal production).

Many behaviors appropriate for the work role of an individual are also appropriate to non-work roles and vice versa. Therefore, self-actualization in the work role is not independent from behaviors and self-actualization in other roles. Consequently, efforts at education for work must be coordinated with planned learning experiences for other roles and inter-relationships should be made relevant.

Although education and, therefore, education for work concentrates only on the individual in attempts to maximize satisfaction of individuals and society, educational efforts must be closely coordinated with society's other efforts to improve work content and context and keep attuned to the existing societal values.

WORK ADJUSTMENT

To the individual, work adjustment is the process of identifying, preparing for, obtaining, and holding a work role which is maximally satisfying (relative to other work roles). For society, the process of work adjustment is identifying, obtaining, and holding individuals who demonstrate adequate performance and are satisfied in the needed work roles. The concept is dynamic, rather than static, since both individuals and work roles change over time.

Dimensions of Work Adjustment

Work adjustment for individual and society leads to their mutual satisfaction -- the terminal objective of education for work. The level of adjustment (and, therefore, level of mutual satisfaction) can be assessed by comparison on individual characteristics and the characteristics of work roles (occupations) made available by society. A comparison of characteristics along five dimensions is proposed. These dimensions are quantity, needs-reinforcers, ability-requirements, location, and time, as shown in Figure 1.²

<u>Dimensions</u>	<u>Individual characteristics</u>	<u>Societal (work role) characteristic</u>
Quantity	Number of individuals available	Number of work roles (occupations) available
Needs-reinforcers	Needs	Reinforcers
Ability-requirements	Abilities	Requirements
Location	Where available	Where available
Time	When available	When available

Figure 1. Dimensions of work adjustment for individual and society

The dimensions of quantity refers to the number of individuals

²The dimensions of needs-reinforcers and ability-requirements and the concept of work adjustment as a mutually rewarding concept were drawn from Dawis, R. V., Lofquist, L. J. & Weiss, D. J. A theory of work adjustment (A revision). Minnesota Studies in Vocational Rehabilitation, No. 23. Minneapolis, MN: University of Minnesota, 1968.

available to fill work roles and the number of work roles available (i.e., demand schedule for positions in each occupation). Although ultimately, quantity refers to individuals actually available for work roles, this dimension also encompasses individuals who are still in preparation for their work roles (i.e., participating in education for work) and will become available at some time in the future. For maximal work adjustment, there must be some balance between the number of individuals available and the number of work roles (jobs). Individuals who want work roles but can't get them (the unemployed) are not maximally satisfied. Work roles which are not filled (vacancies) lead to less than maximal satisfaction by society.

Needs-reinforcers as a dimension of work adjustment describes the ability of a work role (occupation) to satisfy the needs of individuals. Needs refers to personal wants of an individual required for maintenance of self and well being; needs can be intrinsic (i.e., security, autonomy, praise) or extrinsic (i.e., money, environmental). In the work context, an individual's needs are made explicit through his/her occupational interests (i.e., what kind of work would he/she like to do). Work roles provide one means (non-work roles provide additional means) of satisfying an individual's needs. As stated before, satisfaction can come from the content of the work role (usually satisfying intrinsic needs through the tasks performed on the job) and the context of the work role (usually satisfying extrinsic needs through the wages and environment surrounding a job). Although the correlation between individual satisfaction with a work role and performance on the job are yet debated, it seems logical that given the choice between satisfied and unsatisfied individuals with the same performance, society would choose to have those who were satisfied. This choice may be tied closely to the well being of society and its culture. Job creation and redesign efforts are evidence of society's concern for the individual's and its own satisfaction stemming from the correspondence between an individual's needs and the ability of work roles to reinforce those needs.

Ability-requirements as a work adjustment dimension refers to the cognitive, affective, and psychomotor activities which an individual can perform (or has the aptitude to perform) and which society's work roles require (occupational requirements). Ability (requirements) varies with individuals (occupations). The same individual acquires (and loses)

different work related abilities and different levels of competence within the same ability over time. That is, at the pre-school and elementary age, the individuals may be just beginning the exploration of tasks relevant to various occupations. Later on in life, the individual will reach higher levels of ability which are prerequisite to a job. Still later, the individual may need to increase his/her ability in a given area, learn abilities in a new area, or simply refresh the abilities he/she once had. The same process may be happening to the requirements of occupations -- tasks once required may be dropped and new ones added or time spent on various remaining tasks redistributed. Maximum mutual satisfaction for individual and society requires correspondence between individuals with certain abilities and work roles with comparable ability requirements; however, the concept of correspondence in ability and requirements, as with needs and reinforcers, is dynamic since individuals and work roles are constantly changing.

Location as a dimension of work adjustment refers to a correspondence in geographic location (space) of where the individual and work role are physically located. It may be that individual or employment position may have to be moved in order to facilitate mutual satisfaction. Geographic mobility of individuals who want to work or business firms which need workers with certain abilities are manifestations of attempts to seek work adjustment in a spacial sense.

The dimension of time describes the need for correspondence in the temporal dimension. It references when work roles will be available and when individuals will be able to fill them. Time might refer to tomorrow, next month, a year from now, or in five years. Mutual satisfaction of individual and society through work adjustment necessitates individuals having work roles when they are available to work and society having its work roles filled when the roles become available.

Work adjustment is then the process through which mutual satisfaction of individual and society in the work context is operationalized. Work adjustment requires correspondence of individual and society along five dimensions -- quantity, needs-reinforcers, ability-requirements, location, and time. The concept of correspondence is dynamic as individuals and work roles are in a constant state of change.

Stages in Work Adjustment

As stated in the previous section, work adjustment is the point of maximal mutual satisfaction of individual and society in the work context. It must be described at a given time since the relationship of individual to society is dynamic. In moving toward work adjustment, individuals move through several stages of development. These stages can be characterized by the terms awareness, orientation, exploration, specialization, and continuing specialization.³

Awareness refers to the stage at which an individual can recognize and discriminate among occupations. An individual begins to develop and recognize self in occupationally-relevant dimensions (e.g., needs, abilities, location). The orientation stage is characterized by the ability to conceptualize and classify occupation. An individual can classify self in relation to broad categories of occupational need satisfiers and ability requirements. Exploration is the stage of reality testing; an individual explores selected occupational areas. At the exploration stage, an individual is able to clarify self in relation to occupational need satisfiers and ability requirements. Specialization is the stage at which saleable skills for selected occupations are developed. An individual is refining abilities and motivational patterns for selected occupations. The continuing specialization stage is one of maintaining and upgrading previous learned skills. An individual at this stage is constantly monitoring ability requirements and need reinforcers patterns of the occupation being performed.

The stages of work adjustment as described are not associated with a particular age or educational level of the individual. Rather, an individual can be at several stages at once with respect to different occupations (i.e., be a welder just becoming oriented to accounting occupations). However, given an occupational area, the stages fall in a definite sequence (in the order described) for an individual.

To be most effective, education for work programs should be planned so as to fit the stage of work adjustment of an individual (i.e., an awareness program is different from a specialization program). At the same time, if education for work is to be comprehensive, it must be able to serve

³Ibid. Moss, J. Jr., Smith, B. B., & Copa, G. H. Some major concepts in a rationale for education for work.

individuals at all stages of development in all occupational areas. Since individuals vary in the age at which they reach various stages (sometimes being at two different stages for different occupational areas at the same time), the provision of a set of programs to meet the needs of all individuals is a complex and resource consuming venture.

MISSION AND PERFORMANCE REQUIREMENTS OF VOCATIONAL EDUCATION

In specifying the mission and performance requirements for vocational education, heavy reliance will be placed on the contents of current federal legislation as a bench mark. There are other ways of approaching the definition of parameters of vocational education, however the definitions contained in federal legislation have gone through the most extensive public hearings and social decision making process and are therefore perhaps the most accepted and commonly used.

Given the bench mark of current federal legislation, vocational education is one of society's planned and organized processes for providing education for work. By definition in federal legislation, vocational education means "organized educational programs which are directly related to the preparation of individuals for paid or unpaid employment, or for addition preparation for a career requiring other than a baccalaureate or advanced degree."⁴

It should be recognized that this document is an amendment to a previous document and that it is reasonable to expect more amendments or whole new documents defining vocational education. The point is that the definition is not permanent, but rather flexible at this time to meet the felt needs of society.

As a planned and organized process in actual operation, vocational education operates within a context. This context evolves from the documents already mentioned, from interpretations of those documents by persons operating the process, from knowledge of how persons develop their preparedness for work, and from existing cultural values, resource availability and technology. The context can be thought of, more specifically,

⁴U. S. Congress. Title II - Vocational education, Public Law 94-482. Washington, D.C.: U. S. Government Printing Office, October 12, 1976, p. 2211.

as a set of performance requirements which society perceives that vocational education should meet. These performance requirements include both objectives (desired ends) and operating constraints (limitations within which the desired ends are to be achieved); it is expected that these performance requirements will change over time.

Desired Ends

The desired end for vocational education in the larger context described earlier in this report is the enhancement of mutual satisfaction of the individual and society through the individual's participation in the work role (Moss, Smith and Copa, 1972).⁵ The individual receives his/her satisfaction from what he/she does in the work role (content) and the environment in which he/she performs the role (context). Society receives its satisfaction from the quantity and quality of the worker's performance, and from the relevance of the job to society's needs (i.e., in terms of being prepared for a work role which society needs).

Limited Work Roles

The definition of vocational education referred to above further stipulates that its programs are designed to prepare individuals for employment other than that requiring a baccalaureate or advanced degree. This stipulation delineates the types of work roles, or more specifically occupations, for which vocational education provides preparation. The occupations generally excluded by an interpretation of this stipulation are those requiring a baccalaureate or higher degree (i.e., largely included in the category of work roles labeled "professional" by the U. S. Department of Labor). By this legal delimitation of the work roles of concern to vocational education, it is evident that vocational education is not responsible for all of education for work.

⁵This position on desired ends is that of the author as drawn from the earlier described work by Moss, Smith, Copa (1972). The position, although not in conflict with federal legislation, is not contained in the legislation.

Realistic for Employment Opportunities

Although the managers of vocational education do not have direct control of the occupations which are relevant to society, they are required to be aware of society's needs and operate accordingly. The Amendments state that individuals participating in vocational education will have access to programs which are: "...realistic in the light of actual or anticipated opportunities for gainful employment..."⁶ If vocational education is to result in maximum mutual satisfaction to the individual and society and one way in which society gets satisfaction is from having an individual in a relevant work role (i.e., if the individual is not able to find a work role there is no satisfaction for the individual or for society from the individual's work), then vocational education managers must be aware of the work roles society wants filled (i.e., employment opportunities).

Concern for Individual

Vocational education is an educational process. As a process, education is immediately directed at changing the individual. It is a planned, organized learning experience directed at making individuals aware of their response potential in a role or altering the role behavior of an individual in a manner which will facilitate interaction and result in fuller self-actualization of the individual and society. Vocational education is directed at changing the individual with respect to his/her interactions in a work role (although it is not entirely independent of affecting cultural values and work role requirements).

Equal Educational Opportunity

One of the values in our culture which is relevant to any educational program supported by our society is the concept of equal educational opportunity. As a performance requirement it means that individuals have an equal opportunity to pursue the education of their choice. This requirement can be described in several dimensions to more closely define the context of vocational education. These dimensions are: ready access and suited to needs, interests and ability to benefit.

Ready Access. In clarifying the purpose of vocational education, the

⁶Ibid. U. S. Congress, p. 2170.

Vocational Amendment of 1976 state that vocational education should provide programs so that "persons of all ages in all communities of the State those in high school, those who have completed or discontinued their formal education and are preparing to enter the labor market, those who have already entered the labor market, but need to upgrade their skills or learn new ones, those with special educational handicaps, and those in post-secondary schools will have ready access to vocational training or re-training..."⁷ The interpretation of this statement is that vocational education should provide equal educational opportunity by being accessible in terms of geographic proximity, cost, and time scheduling to all persons regardless of age, race, and sex. The requirement for ready access is often at odds with efficiency in achieving the desired ends for vocational education. Accessibility as a dimension of the equal educational opportunity performance requirement has direct implications for the quantity or number of programs to be offered and the geographic location of those programs in a state.

Suited to Needs, Interests, and Ability to Benefit. In its concern with the individual and his/her preparation for a work role in the face of providing equal educational opportunity, vocational education must be attuned to the individual's needs, interests, and ability to benefit from participation.⁸ The interpretation of this dimension is that vocational education must be suited to the status of an individual's development with respect to preparation for work and level of satisfaction with a work role (or adjustment for the role if not yet working) in the sense that if more development can take place, the satisfaction of the individual will improve.

The status of an individual's development in terms of preparation for work can be assessed in terms of the following categories: awareness, orientation, exploration, career specialization (initial and continued). These categories of development have been described in a previous section of this chapter.

This dimension does not imply that vocational education must provide preparation for all or any select group of these stages. Rather, it is

⁷Ibid. U. S. Congress, pp. 2169-70.

⁸Ibid. U. S. Congress, p. 2170.

authorized to do any or all. The requirement is that if vocational education provides training to an individual it must be compatible with the stage of development with respect to work of that person if equal educational opportunity is to result. Adherence to this requirement means that vocational education must be prepared to provide preparation for a wide variety of occupations and variety of ability levels with respect to capability to perform a work role.

Society has also identified two particular groups of people with special needs whom vocational education is to serve -- these are the handicapped and the disadvantaged. At present, society's performance requirements is that 25 percent of federal funds given to vocational education at the state level be used for programs serving handicapped or disadvantaged individuals.⁹

"Ability to benefit" implies that the participant in a vocational education program as well as society should be more satisfied with the participant's performance in a work role as a result of his/her participation in a vocational education program. As such, it necessitates that some opportunity to benefit does in fact exist for the individual and/or society before an individual participates in vocational education.

Enforcement of these dimensions of equal educational opportunity will require an assessment of the needs, interests and present level of satisfaction of the population to be served by vocational education. In the absence of this information, planners of vocational education, although cognizant of the concern for the individual, may fail to get maximum effect in terms of change in individual and societal satisfaction. An assessment of this nature provides the baseline from which to measure the achievements of vocational education in terms of this dimension of providing equal educational opportunity.

Time

Vocational education works within a given time horizon. Time can be thought of in the very short run as a time schedule (e.g., high school programs of vocational education normally operate between 8:30 a.m. and 3:45 p.m. in 50 minute blocks of time) all the way to the very long run (e.g., 50 years plus from now). Generally, the shorter the time horizon

⁹Ibid. U. S. Congress, p. 2185.

being considered, the more fixed are the factors affecting the production of vocational education. (Land, labor, capital, and management are the broad categories of the factors of production.) Some factors may be more fixed than others. For example, even in a short time, it may be possible to secure more labor (e.g., another teacher); however, it may be very difficult to acquire more capital (e.g., a new classroom). The long run as a time requirement refers to a time period which is long enough that most factors of production are variable (e.g., new land can be purchased and a building constructed).

Note that actions taken to maximize the "desired ends" for vocational education in the long run may not result in maximizing the attainment of these "desired ends" in the short run. Although maximum effectiveness should be sought in the short run, it may be necessary for it to be constrained by long run objective if effectiveness is going to be maximized over time.

Available Resources

Resources made available to conduct vocational education also act as a performance requirement on what vocational education can accomplish. Resources can be designated in terms of land, labor, capital and management. Although resources can be combined in many different ways and these resources substituted for one another, what vocational education does can not use more resources than it has.

Technology

Technology as a performance requirement refers to how land, labor, capital, and management are combined to form a process designed to accomplish a given end. More efficient and effective processes of vocational education are continually being explored, but the level of development is always a given at a particular point in time.

There are several ways to describe a technology; one of the more common for vocational education is to describe it in terms of content, purpose, institution, and function. Content refers to the subject matter of a program and usually is categorized in terms of occupational groupings. The more traditional content areas are agriculture, distributive, health, home economics, office, technical, and trade and industrial. Another

means of describing the technology of vocational education is to focus on its purpose relative to the needs of individuals to be served. The more traditional categories based on "purposes" are: awareness, orientation, exploration, specialization (i.e., preparation for first job), continuing specialization (i.e., updating, upgrading, retraining). Institution refers to the types of institution in which the program is operated; the more traditional levels are secondary (e.g., high school, secondary vocational centers) and post-secondary (e.g., post-secondary area vocational-technical institutes, community colleges). More recently with the inception of "career education," elementary and junior high schools are also being used in describing the process of vocational education. Note that the purposes and institutions categories are not necessarily parallel; that is, several programs with different purposes may be offered at the same institution. In general, however, elementary programs at elementary schools focus on awareness, orientation, and exploration, secondary school programs on exploration and specialization, and post-secondary school programs on initial and continuing specialization. Function as a technological description of vocational education refers to how resources are used given a program with a particular content, purpose, and institution. Function describes the ways vocational education influences individuals -- through recruitment, guidance, instruction, and placement. The technology of vocational education can also be characterized in other ways such as mode (e.g., individualized, small or large group, computer assisted, and place of instruction (e.g., classroom, shop, laboratory, on-the-job, home).

Planning

The most recent federal legislation states that one of its purposes is to "assist states in improving planning in the use of all resources available to them for vocational education and manpower training by involving a wide range of agencies and individuals concerned with education and training within the State in the development of the vocational education plans."¹⁰ To enforce their intent, the Congress mandated a five year state plan and annual program plan and accountability reports involving the active participation of a specified group of agencies and individuals in a

¹⁰ Ibid. U. S. Congress, p. 2169.

detailed process. These requirements imply a concern for increased planning activities of higher quality, more comprehensive planning of total occupational preparation services and involvement of those who will be affected by the plan.

Efficiency

Efficiency is also a value that our society endorses. It can be interpreted to mean that once it is decided what must be accomplished, and the parameters (i.e., performance requirements) within which one must operate, it should be done in the most efficient manner (i.e., least costly in terms of resources used). For vocational education, efficiency is interpreted as a performance requirement stating that vocational education should provide training for only those work roles for which it can train more efficiently than other agencies (e.g., private schools, firms, family), for individuals with special needs not served by other agencies, and/or where other agencies cannot provide enough training. This performance requirement should be the last to be applied to the operation of vocational education after the other performance requirements have been brought to bear.

Summary

Vocational education was defined as a process directed at education for work or more specifically, to maximize the mutual satisfaction of the individual and society with the individual's performance in a work role. In view of this context, a mission or "desired end" for vocational education and the performance requirements or conditions under which the mission is to be accomplished were proposed. The mission was to increase to a maximum the individual's satisfaction with the context and context of his/her work role and to increase to a maximum society's satisfaction with the performance of individuals in their work roles and the importance of these work role behaviors to society's needs.

The performance requirements within which the mission is to be accomplished were based on legal documentation of society's intended purpose for vocational education, interpretations of that documentation, existing cultural values, resource availability and technology.

Chapter II. A MODEL OF VOCATIONAL EDUCATION

A model is intended to be a replica of reality (i.e., as a model airplane is to an actual airplane). Its purpose is to display the salient characteristics of reality; however, if the model is as complex and on the same scale as reality, it has little advantage. Rather, the purpose is to construct models which are simpler than reality yet be useful in explaining and predicting phenomena with a high degree of accuracy. Modeling depends on the assumption that, although there may be many variables required for perfect explanation of a phenomena, a much smaller group of variables can be used to provide a "good" explanation. According to Ackoff and Sasieni, "the trick, of course, is to find the right variables and the correct relationships between them."¹¹

The degree of detail encompassed in a model may vary greatly (e.g., from a paper folded airplane to a very complex, electronically control pilot trainer). The level of detail most depends on how the model will be used (e.g., for entertaining a four-year old or testing flight characteristics before piloting a 20 million dollar full scale airplane). Also important, but less so, are the time and dollars available to construct and operate the model and the difficulty in technologically including the detail. The matching of a model and its use merits critical thinking and judgment. If not enough detail is added, the model may give a very superficial view of reality; if too much is added, it will be cumbersome and expensive to operate by all except the very skilled, and even then, its results will be difficult to explain and rationalize.

So it is in constructing a model of vocational education; the question is, "How much detail to include?" The answer will result from consideration of, "How will the model be used?" and the answer is apt to be different depending on the use. For example, a model for use in deciding how many dollars to authorize for federal vocational education legislation

¹¹ Ackoff, R. L. & Sasieni, W. Fundamentals of operations research. New York, NY: John Wiley and Sons, 1968, p. 60.

may well differ from the model for deciding if an auto mechanics program should be added to the Oakland Vocational Center in Minnesota next year. However, as with the example cited using airplanes, some of the salient characteristics (i.e., key variables) may well be the same in both models.

Given this background, the purpose of the model of vocational education presented in this section is to define the process and major inputs and outputs of vocational education as viewed from a state, rather than federal or local, level in order to facilitate planning of vocational education (it may require a much more detailed model for other uses such as the evaluation of vocational education). The model is constructed by encompassing the context, mission, and performance requirements of vocational education described in the previous chapter. The model will be constructed in stages adding more variables (and complexity) at each stage. The strategy for planning vocational education discussed in the next chapter requires a model of this nature as a prerequisite.

VOCATIONAL EDUCATION AS A PROCESS

The mission and performance requirements for vocational education imply that vocational education is a process, it is a means rather than an end. As a process, vocational education has its major impact on individuals as opposed to occupations. Individuals serve as the basic input to and output of vocational education; hopefully, the individual is changed some how between the input and output stage by the process of vocational education. A simple model showing the relationship is shown in Figure 1.

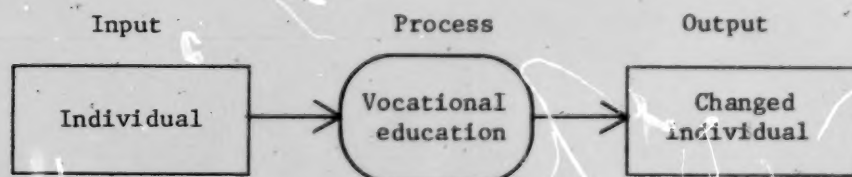


Figure 1. Model of vocational education - Stage 1

INDIVIDUAL'S LIFE ROLES AND VOCATIONAL EDUCATION

Individuals self actualize (obtain satisfaction) through several

roles during their lifetime (often playing several roles at the same time). The roles may be categorized as economic, familial, political, associational, and religious. The economic role can be subdivided into productive and consumer roles; the productive, economic role is the one of concern here -- it forms the work role. Through vocational education, the expected change in the individual is in his/her behavior in a work role. However, the individual's behavior in his/her several roles is interactive and, therefore, change in behavior in the work role is not independent of behavior in other roles and equally, change in non-work role behavior is not independent of behavior in a work role. This more complex view of an individual is shown in Figure 2.

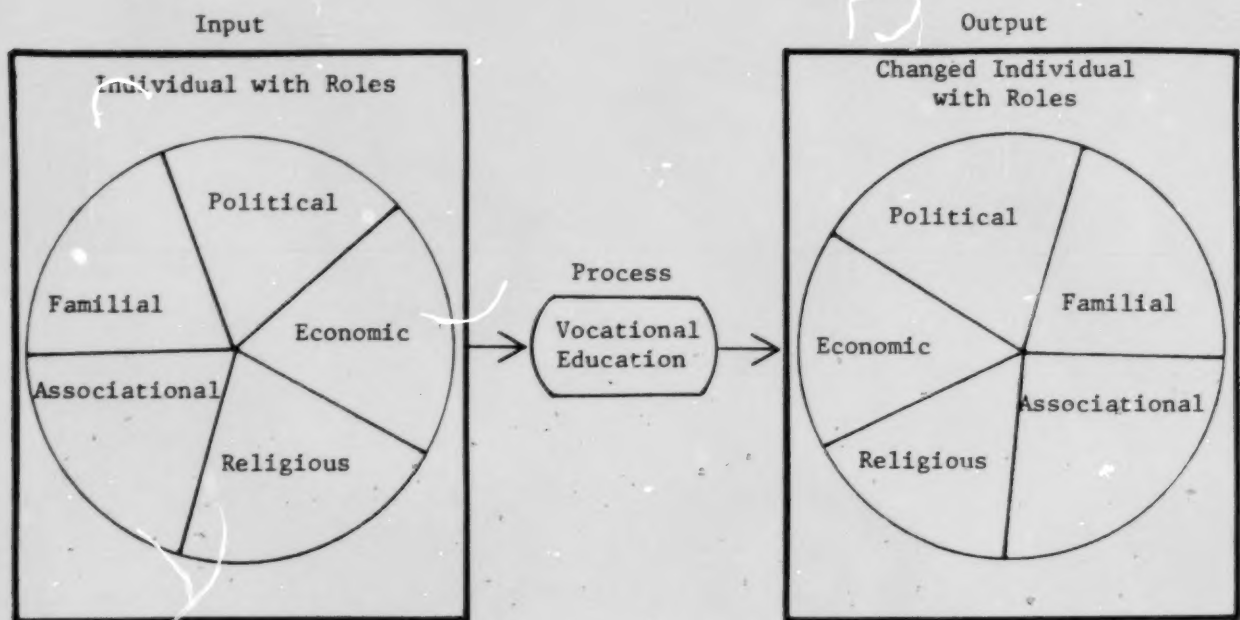


Figure 2. Model of vocational education: Stage 2

INDIVIDUAL'S WORK ROLE AND VOCATIONAL EDUCATION

The individual who participates in the process of vocational education has several characteristics which are relevant to determining the potential for affect by vocational education. These characteristics are number of individuals, needs, ability, location, and time. Number of individuals indicated how many individuals with particular characteristics are to be

served. Needs refer to the intrinsic and extrinsic motivational wants of an individual which can at least partially be filled by work (e.g., security, authority, creativity). Ability refers to cognitive, affective, and psychomotor tasks which an individual can perform or has the aptitude to perform as it relates to the world of work (e.g., make a butt weld, discipline a child, take a soil sample). The same individual will move through different levels of ability related to his/her work role over time. That is, at the pre-school and elementary age, the individual may be just beginning the exploration of tasks relevant to various occupations. Later on in life, the individual will reach higher levels of ability which are prerequisite to a job. Still later, the individual may need to increase his/her ability in a given area, learn abilities in a new area, or simply refresh the abilities he/she once had. Location refers to where the individual is geographically located. Time refers to when the individual is available to participate in vocational education, and eventually, when he/she will be ready to work. The characteristics of an individual relevant to potential for change in behavior in his/her work role are as shown in Figure 3.

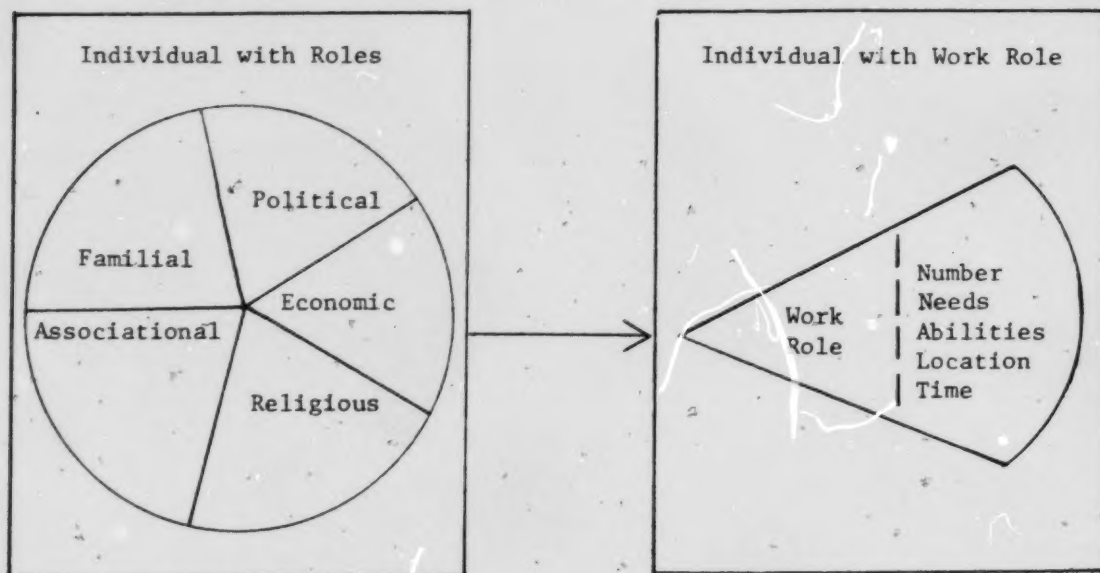


Figure 3. Characteristics of individual which are most likely to be changed or affect the change caused by vocational education.

The model of vocational education can now be made more explicit by defining the variables describing an individual which can be changed by vocational education (i.e., needs and abilities) or which can influence the potential for affect by vocational education (i.e., location and time). This more complex model is shown in Figure 4.

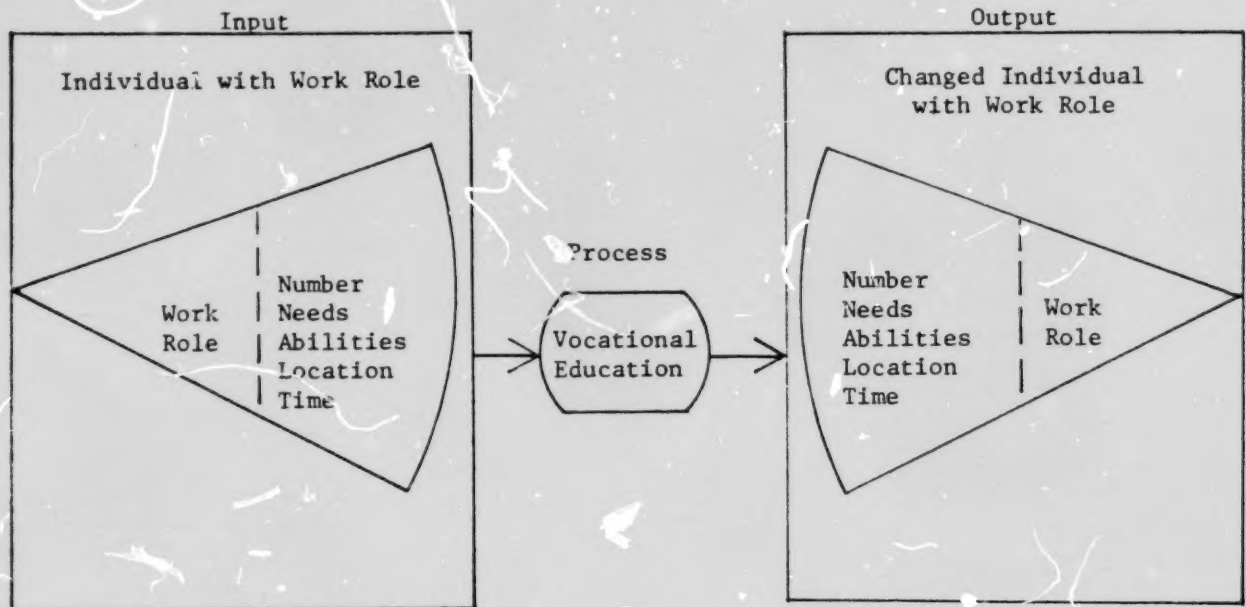


Figure 4. Model of vocational education: Stage 3

CHANGING NATURE OF INDIVIDUAL'S ROLE

As depicted in Figure 4, vocational education has the opportunity to change the individual only once, whereas in reality, according to the pre-specified performance requirements, the individual may participate in vocational education at several times during his/her lifetime. In order to identify this relationship between input and output, a loop indicating the dynamics of the situation is required, as is shown in Figure 5.

TECHNOLOGY OF VOCATIONAL EDUCATION

In the definition of performance requirements, the process of

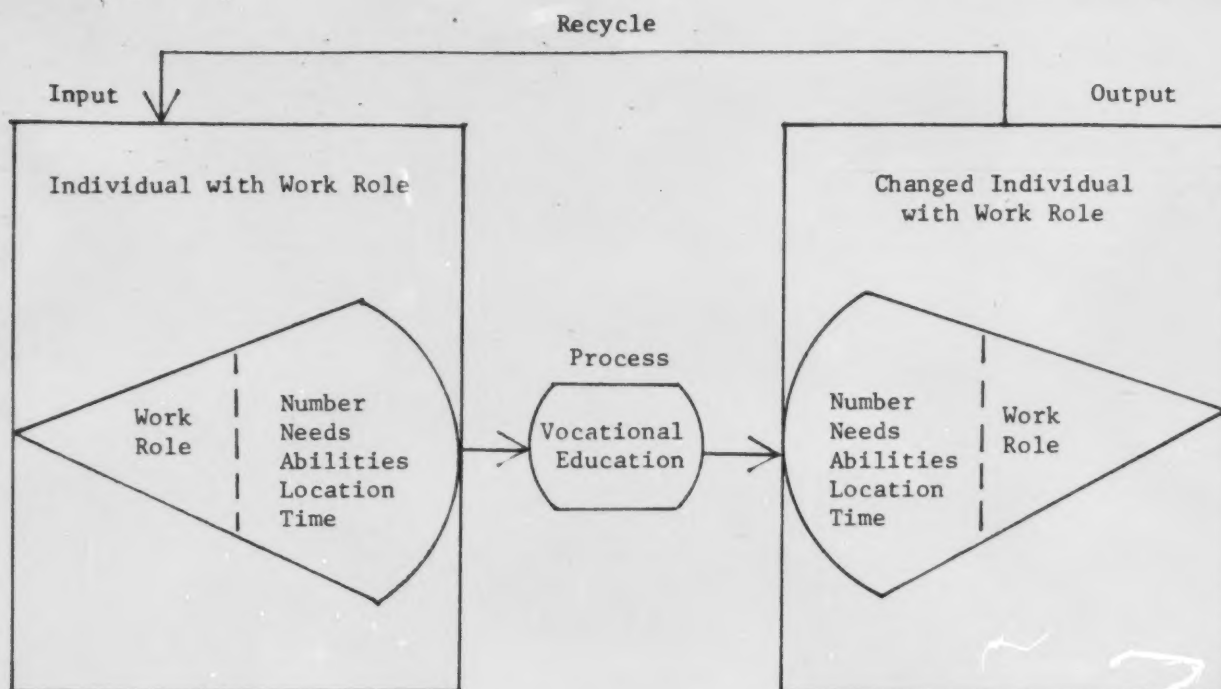


Figure 5. Model of vocational education: Stage 4

vocational education was referred to as the "technology" of vocational education. This technology is often described in terms of content (e.g., agricultural occupations, business and office occupations), purpose (e.g., exploration, specialization), institution (e.g., secondary school, secondary vocational center, post-secondary vocational institute), and function (e.g., recruitment, guidance, instruction, placement, follow-up, administration). Content describes the knowledge and behavior of an individual which are changed by vocational education relative to a particular occupation or group of related occupations. At the most detailed level, it is a list of the occupations for which vocational education provides preparation and the tasks required to perform those occupations. Purpose references the vocational education process to the level of development of the individual with respect to preparation for work. Institution refers to the type of institution in which the vocational education is carried on. Function refers to the type of activity which consumes resources (i.e., time, dollars) and results in some output (i.e., change in individuals). The process of vocational education is also described by its geographic

location (i.e., where is the program located) and timing (i.e., when does the program start and finish). Adding these variables to the model, it appears as in Figure 6.

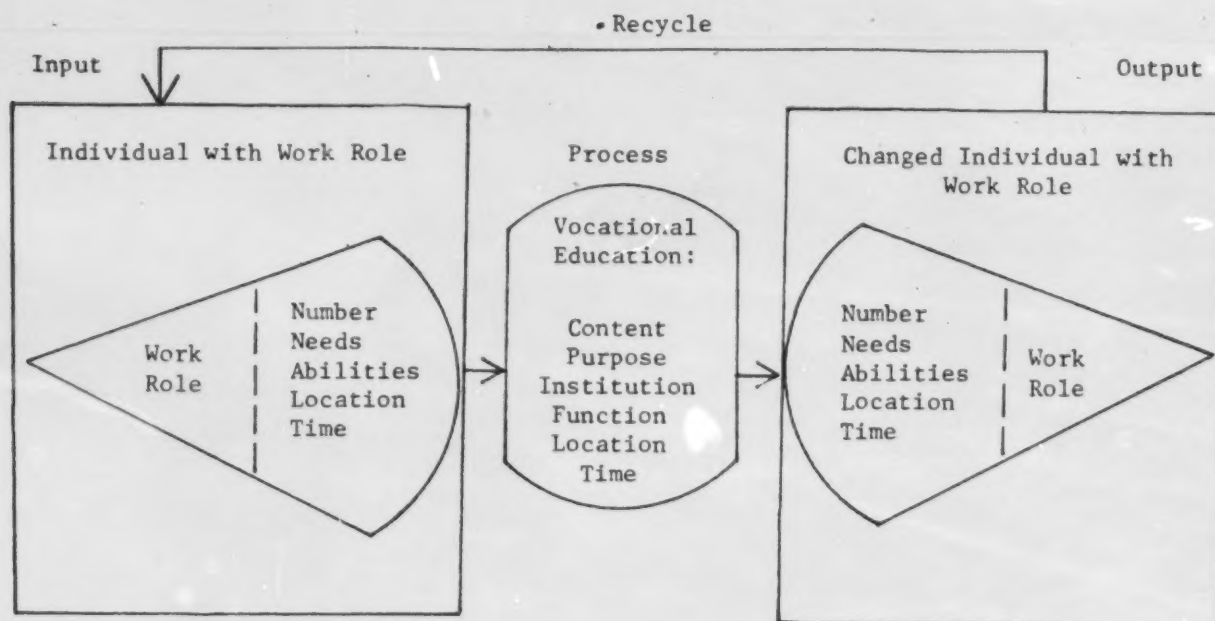


Figure 6. Model of vocational education: Stage 5

SOCIETY'S FUNCTIONS AND VOCATIONAL EDUCATION

According to the mission of vocational education defined in the previous chapter, the desired ends for vocational education are the enhancement of mutual satisfaction of the individual and society through the individual's participation in the work role. In order to assess the potential and actual increase in mutual satisfaction (benefits) from participation in vocational education, both individuals and society must compare their level of satisfaction before and after the individual is involved in vocational education. Note that society is not directly affected by vocational education, rather society is taken as somewhat of a given and not under control by vocational education. Society does, however, provide much of the resources for the conduct of vocational education and is, therefore, not a totally disinterested party to what vocational education is doing and accomplishing. In making the comparisons, the individual should examine what his/her wants are in terms of the work role.

Individuals can increase their satisfaction through vocational education by exploring and identifying their needs, improving their ability, changing their geographic location, or changing the time at which they will be available for work. Assessment of satisfaction by individuals can take place along these four dimensions before entering a work role (e.g., while in school) or while in a work role and contemplating whether to stay or move to a different work role. Individuals should assess what they want and what is in terms of their own goals (and, there by, the potential for increased satisfaction); however, this assessment should take place in the context of what society wants and is. Satisfaction from a work role will only be if the individual, in reality, possess a work role (i.e., has a job). Society provides these work roles; therefore, although the individual is free to do as he/she wants, the actualization of what is wanted from the work role is dependent on a realistic picture of what society wants and the work roles it wishes to make available. For example, an individual may wish to be a welder, but society may already have an abundance of welders relative to the number of welding positions (jobs) it needs filled; an individual can still choose to be a welder if he/she wishes, however, the individual should realize that the probability of actualizing his/her wish (i.e., being a welder) may be relatively low. The point is that individuals have freedom of choice (based on their goals), but must face the consequences of reality (in the work role, reality is the positions available or which can be made available through job development, etc.).

Society in this report is defined as everybody other than the individual in question. In order for society to maintain itself and grow requires certain functions to be accomplished. These functions are economic (production and consumption), familial, political, associational, and religious. Observing society functionally, it could then be diagrammed in a pie graph similar to that shown for the individual; a graph of this kind is shown in Figure 7.

SOCIETY'S WORK FUNCTION AND VOCATIONAL EDUCATION

As with the individual's roles, the focus of vocational education is on the economic function relative to society as a whole, and particularly to the production (work) function. Society's work function needs are made

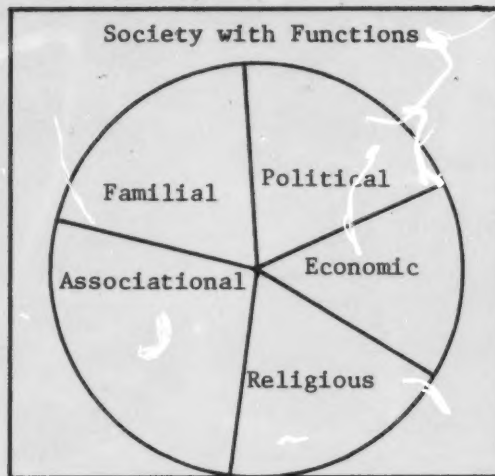


Figure 7. Functions necessary for a society to be maintained and grow.

explicit in terms of occupational demand. The relevant dimension of demand cited earlier (in Chapter I) are number of positions, reinforcer patterns, requirements, location, and time. Number of positions refers to the number of different work positions (jobs) of various kinds which society makes available in order to accomplish the production, processing and distribution of goods and services desired. Reinforcer patterns refer to the description of an occupation's potential at fulfilling an individual needs. Requirements describe the skills, knowledge, and attitudes needed to satisfactorily perform a given job. Location describes where, geographically, the position is located and time refers to when it is available to be filled. The five dimensions of society's occupational demands are shown in Figure 8.

Occupational demand of society with its various dimensions can be added to the model of vocational education with a "comparing process" going on between the input and output of vocational education (individuals). The comparison of occupational demand and the individuals potentially entering vocational education is often called a "needs" assessment; the comparison of occupational demand and the individual leaving vocational education is referred to typically as an "evaluation" or more specifically a "product evaluation." These relationships are shown in Figure 9. As depicted, vocational education, in general, has no direct control over occupational demand, but must be aware of occupational demand in assessing the effectiveness of vocational education.

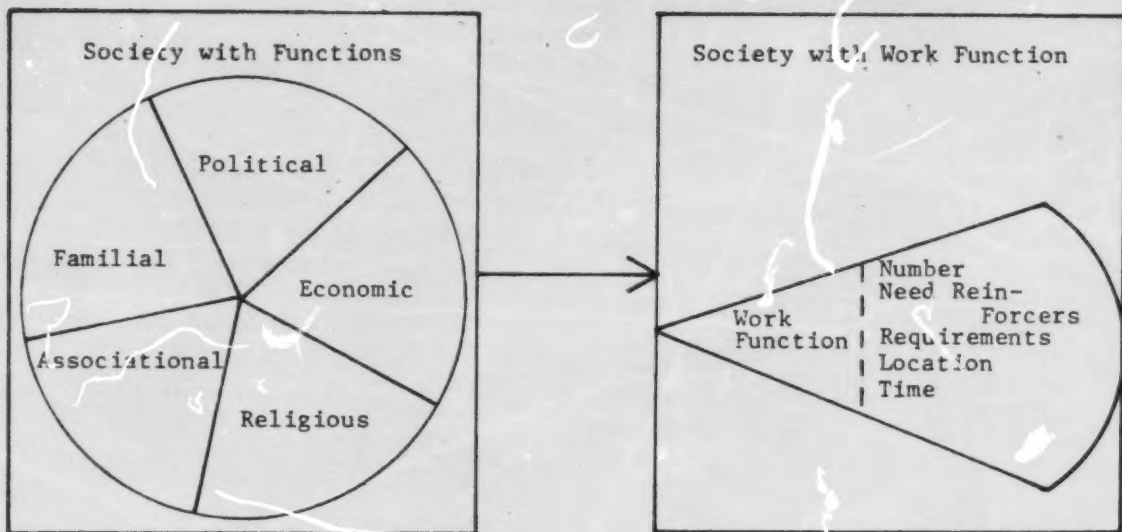


Figure 8. Characteristics of society's work function which relate to an individual's performance in a work role.

RESOURCES FOR VOCATIONAL EDUCATION

The process of vocational education operates in an environment characterized in Chapter I by a mission and set of performance requirements. The mission and several of the performance requirements have already been incorporated into the model of vocational education shown in Figure 9. That is: (1) vocational education operates on the individual (although changes in the individual may later have several impacts on a family, business, community, etc.), (2) the technology (process) of vocational education is often characterized by purpose, level, content (content requirements limit vocational education to occupations requiring some minimal level of training, but not a baccalaureate degree or higher for entry), institutions, and function, (3) the concern for equal educational opportunity implies that vocational education be suited to an individual's needs, interests, and ability to benefit (therefore, the characterization of an individual in terms of needs and abilities) and ready access (the characterization of individuals and process of vocational education in terms of location and time), and (4) the mission or desired ends for vocational education are stated in terms of potential contribution to mutual satisfaction of individual and society with the functioning of the individual in

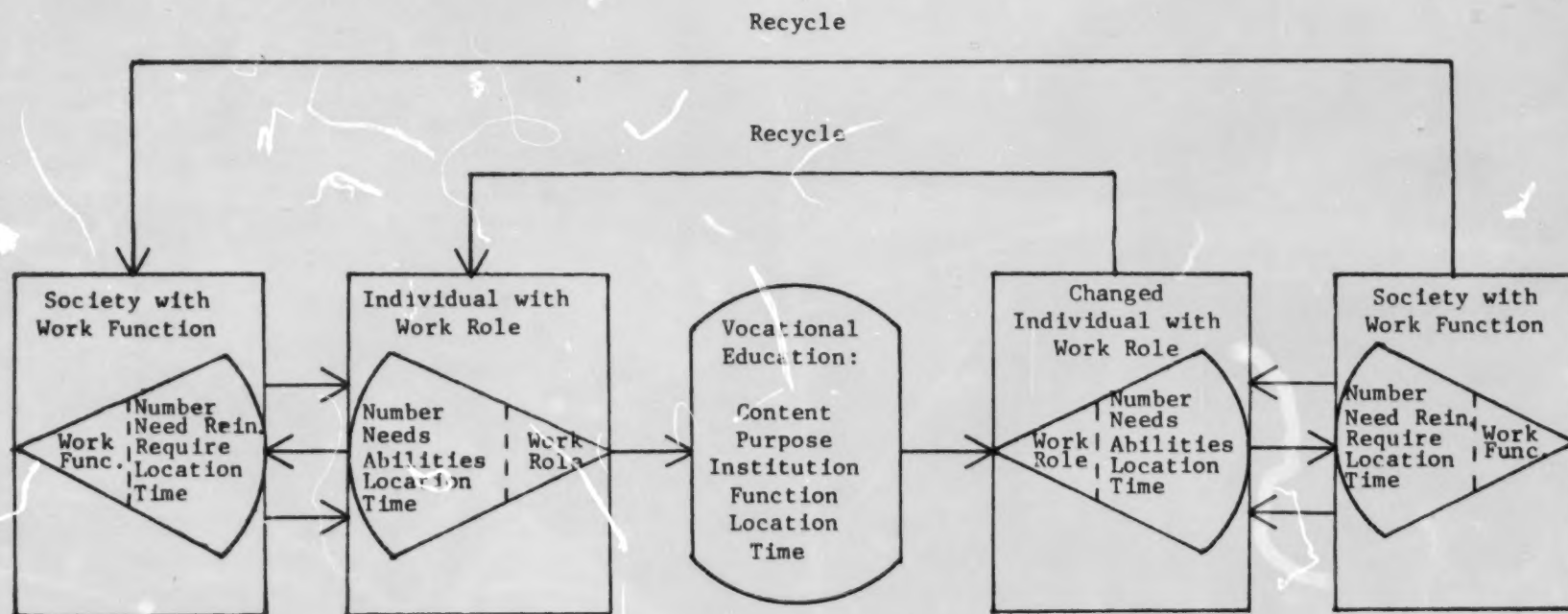


Figure 9. Model of vocational education: Stage 6

his/her work role (therefore, the relationship between the input and output of vocational education and the occupational demands of society). There are additional performance requirements which act as very practical constraints on the process of vocational education.

First, managers of vocational education face constraints of time durations and resources. The time duration could be four weeks, nine months, one year, five years, etc. Whatever the time duration, it becomes a constraint on what can and must be done (e.g., you can add a new competency to a program in one day but it may take two years to add a new laboratory as prerequisite to adding a whole new training program for a given occupation). Available resources in terms of land, capital (e.g., buildings, supplies, equipment), labor (e.g., teachers, counselors), management (e.g., administrators), are another constraint. Time and dollars taken together with technology provide very realistic constraints on what is possible and feasible. These characteristics are added to the model and shown in Figure 10; note that the dotted lines represent flows of resources and time while the solid line represents the flow of individuals (students) or groups of individuals. Resources for vocational education come from society (e.g., local, state, and federal government) and from individuals (e.g., tuition); some resources such as classrooms and teachers recycle in that they are not totally used up in one pass through the vocational education process.

ALTERNATIVES TO VOCATIONAL EDUCATION

Another performance requirement is efficiency. This requirement forces the managers of vocational education to look both internally and externally and again involves the "comparing process." Internally, the most efficient process of vocational education should be used to accomplish a given objective; the problem of articulation become apparent as individuals recycle through various vocational education processes (e.g., secondary vocational program to post-secondary program). Of equal importance, it forces an external assessment to see if there are more efficient means of accomplishing the objective other than through the available processes of vocational education. The implication for the model is that vocational education is part of a larger process (i.e., education) of which

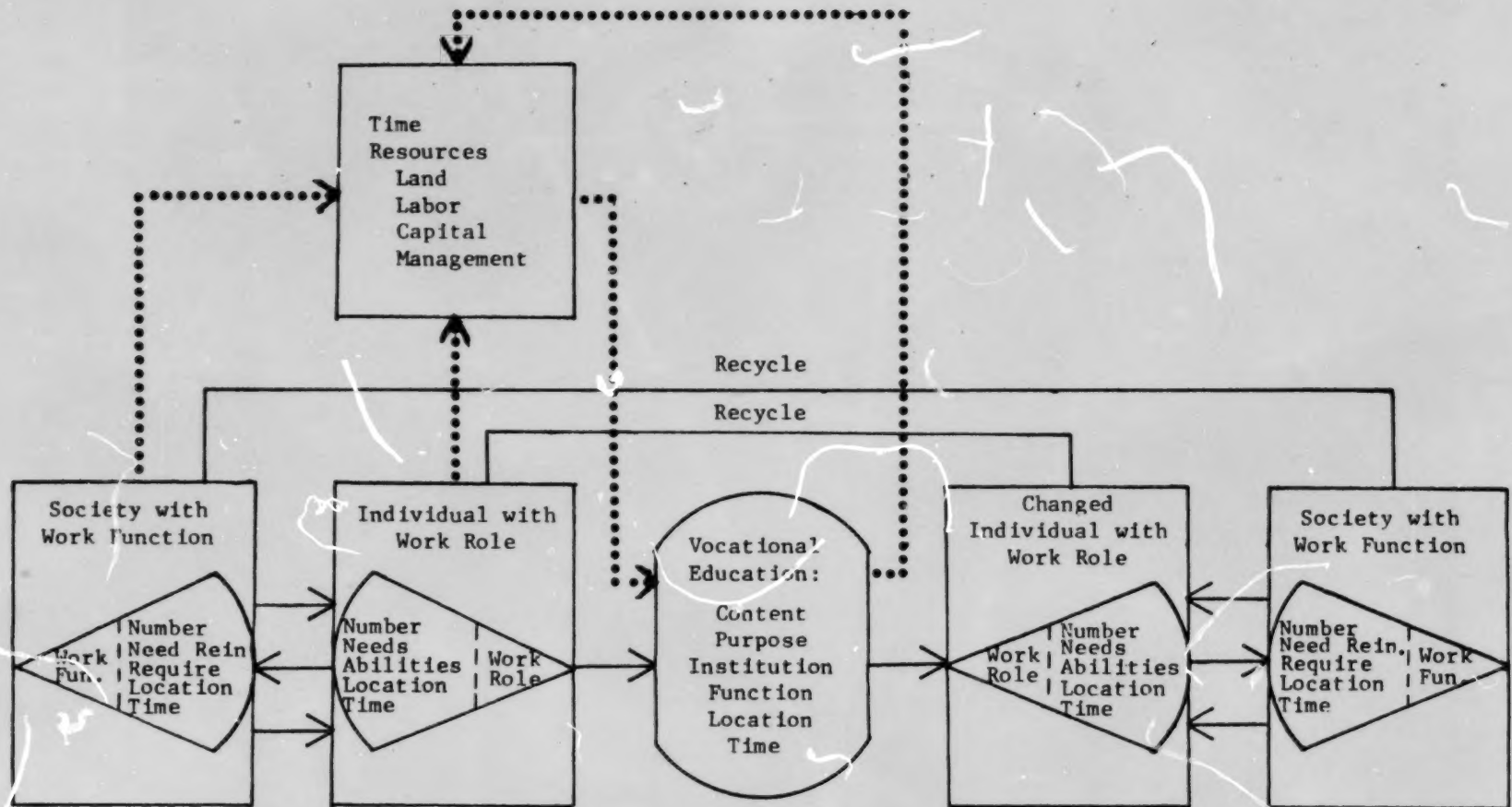


Figure 10. Model of vocational education: Stage 7

some is accomplished with public support and other by private agencies or a combination of the two. Even in the public educational institutions, vocational education is only one of several means; its relationship to general education and other types of specific education (e.g., music, languages, physical) must be continuously examined. The model of vocational education now takes on the appearance of Figure 11.

CULTURAL VALUES AND VOCATIONAL EDUCATION

Two more characteristics must be added to the model of vocational education. First, vocational education operates in a society characterized by certain values. These values are always in a constant state of change; however, there are some overriding values that have held over time. The values most relevant to the operation of vocational education are: (1) democratic process as means of governance, (2) equal educational opportunity, and (3) concern for efficiency. The value relating to the democratic process implies that individuals are important and have the opportunity and responsibility to make decisions on what they want out of vocational education (e.g., what courses they want to take, when they want to take them) and how vocational education ought to be operated (e.g., what vocational education does, how much resources it should get). Equal educational opportunity has already been alluded to in terms of vocational education providing a process which meets the needs of individuals and is accessible to all who can benefit (e.g., to all ages, races, and both sexes). Efficiency as a value has also already been referenced as a concern to make maximum benefit from limited resources; it means that after deciding what to do, you do it for the least possible resources.

INFORMATION AND VOCATIONAL EDUCATION

The last characteristic of the model which needs to be added is the feed forward and feed backward of information. The primary information flows of concern are: (1) the feed forward of information about the values held by the society (and relevant changes) to the managers of the process of vocational education, (2) the feed forward of information about how vocational education can benefit certain individuals (resulting from

the comparing of societal wants [occupational demand] and individual wants [preparation for an occupation]) as shown on the left side of Figure 11, and (3) the feed backward of information on how successful vocational education was in providing the benefit (resulting from the comparison process shown on the right side of Figure 11). The place of societal values and information flows in the model of vocational education are shown in Figure 12; the dashed lines represent information flow.

SUMMARY

A model was constructed to display the salient characteristics of vocational education for use in planning at the state level. The objective was to define the important variables and their relationship in planning vocational education. The model was constructed out of the context made explicit in Chapter I; the context should be reviewed to identify the assumptions and limitations of the model.

The characteristics of vocational education judged salient were as follows:

1. Vocational education has its primary affect on individuals as opposed to society as represented by various sub-groups such as employers.
2. Vocational education has its primary affects on preparation for and performance in a work role.
3. The objective of vocational education is to improve the mutual satisfaction of individual and society by improving the correspondence between the expectations and performance of individual and society.
4. The dimensions of correspondence between individuals and societal expectations and performance in the work context can be defined in terms of quantity, needs-need reinforcers, abilities-requirements, location, and time.
5. A comparison of individual and societal expectations and performance should be made in assessing who can benefit from vocational education; this information should be fed forward to managers of vocational education for use in recruiting and guidance.

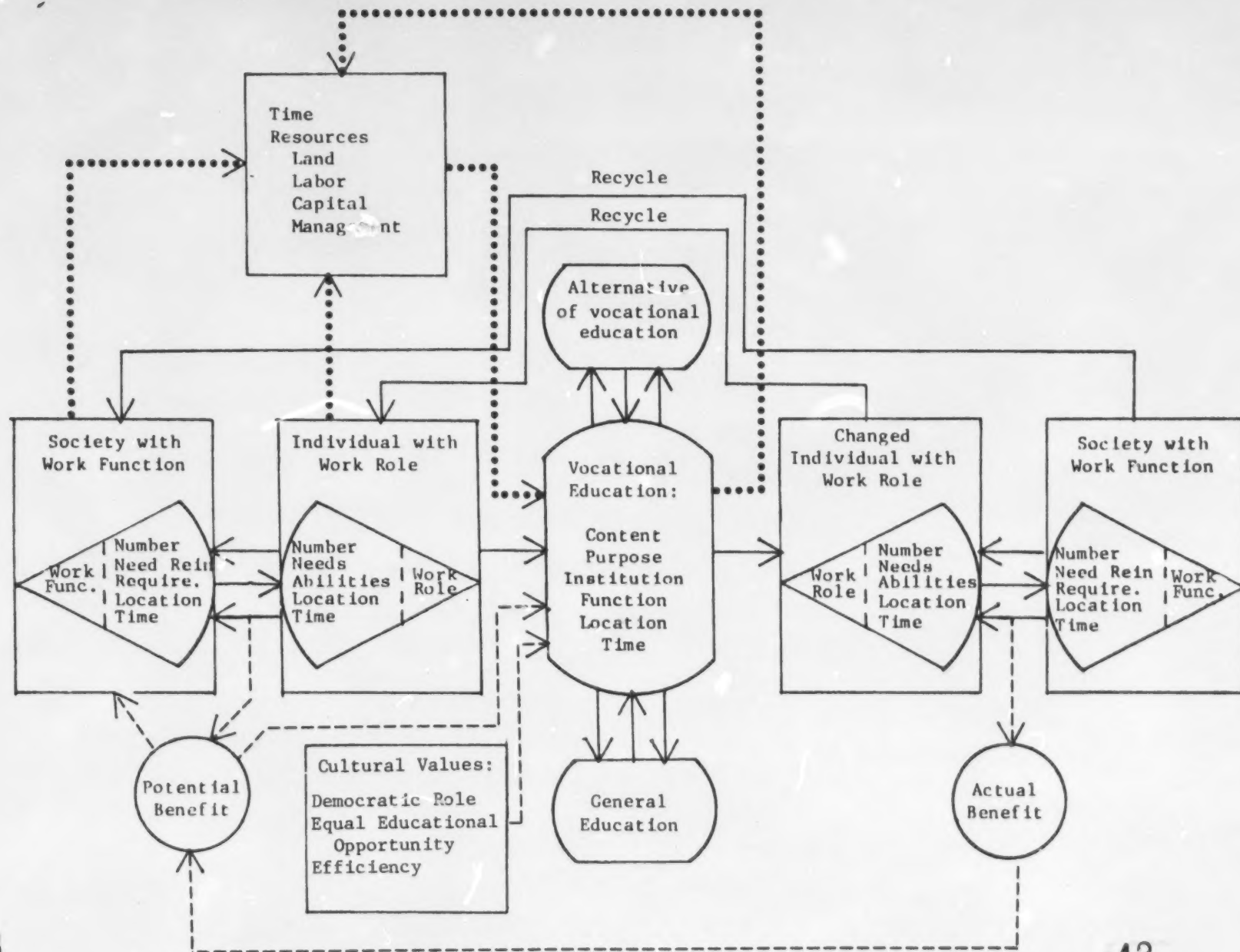


Figure 12. Model of vocational education: Stage 9

6. Vocational education operates in a world of limited resources (i.e., land, labor, capital, and management) and time; resources are provided by both society as a group and by individuals being served; some resources recycle.
7. Vocational education operates in a world characterized by certain underlying values (i.e., equality of educational opportunity, democratic rule, efficiency).
8. Vocational education has a technology which can be described in terms of content, purpose, institution, function, location, and time; the technology must be broad enough to deal with all types of individuals.
9. Vocational education must relate to general education in ways that are effective and efficient.
10. Vocational education has substitutes in the form of alternative sources of training for a given occupation (e.g., on-the-job, private vocational schools).
11. The benefits of vocational education can be assessed by comparing the degree to which individual and societal wants in the work context have been satisfied after the individual leaves the process of vocational education; this information should be fed back as a means of improving the assessment of potential benefit for new individuals and the process of vocational education.
12. Individual and societal expectations and performance are in a constant state of change; individuals may wish to recycle through the vocational education process at various times in their lives.

These characteristics shown in model form, provide a means of conceptualizing the important features of vocational education which must be considered in planning at the state level. The model is not intended to "out wit" or produce a plan for those who plan vocational education -- this would require a model with utter complexity, little generalizability, not to mention large expense. Rather the model is intended to be used to

make explicit the views of those who plan and help these persons identify and test new alternatives to improve vocational education for individuals and society as a whole. The model should also be useful in teaching planning and communicating state plans to federal and local educational agencies. Last, the model, if representative of reality, identifies important questions planners need to ask and implies the information needed to provide answers.

The important questions which seem to be implied by the model are as follows:

1. What educational activities will contribute to increasing the mutual satisfaction of individuals and society in the work context?
2. Which educational activities could vocational education do?
3. Which educational activities should be left to alternative sources of vocational education (or provided in some kind of cooperative form)?
4. How should vocational education interface with general education?
5. How much time and resources are available and required to perform the needed educational activities; how should the resources be generated?
6. What process should be used to provide the educational activities as defined in terms of content, purpose, function, institution, location, and time?

The next chapter outlines a strategy for planning vocational education using the model developed in this chapter and focusing on important questions cited above.

Chapter III.

PLANNING VOCATIONAL EDUCATION

A plan defines what you want and how you are going to get it. It implies future rather than past activities. Essential to a plan is a definition of "what you have" and "what your want." A plan is analogous to a map defining how you are going to get from where you are to where you want to be. Although a common fault in planning, it is quite apparent that it would be difficult to construct a map if you did not know where you are or where you want to go. As with a map, a plan should specify who it is for, how you are to get what you want, and any intermediate points through which you must pass. Also apparent from map construction is the operating principle that the more specifically you can describe "where you are" and "where you want to be," the easier it is to draw the map (plan) and the more likely and quicker you will get to your destination (what you want).

Throughout this section of the report, the analogy of a plan to a map should be kept in mind. In this analogy, the planner is viewed as a travel agent, vocational education as one means of travel, and the individual (potential students of vocational education) as the client. Using this framework, the planner assists by providing information and options and the clients decide what they want at a given price.

A THEORETICAL STRATEGY FOR PLANNING VOCATIONAL EDUCATION

The word "strategy" implies an approach or plan of attack for obtaining a desired end. In the context of vocational education, the desired end is stated in terms of maximizing mutual satisfaction of society and individual in work roles within a set of performance requirements (detailed in previous section).

The strategy proposed is that changes be taken in order of their contribution to increase mutual satisfaction of individuals and society per unit of cost (in order of their effectiveness-cost ratios). This seems a logical approach when moving from a present position to some "better" position in the future relative to certain criteria (e.g., income, level of

satisfaction). In moving from "present" to "better" it is unusual (but should be done every so often) that one would consider dropping the whole activity (i.e., all of vocational education). Rather, small changes are made in the present activities by adding new and/or changing or deleting old activities. These small changes should be judged in terms of their contribution to mutual satisfaction and cost. Changes should be implemented in order of contribution per unit of cost.

In order to implement this strategy, the "present" position of society and individuals with respect to mutual satisfaction as well as "should be" position must be assessed. Besides knowing these two positions, the change in mutual satisfaction resulting in various ways of moving from "present" to "should be" must be identified. These "ways of moving" and their resulting contribution to mutual satisfaction form the potential array of alternatives which could be implemented. These alternatives must then be ordered in terms of their contribution to mutual satisfaction per unit of cost.

Prerequisite to ordering is a prediction of the amount of mutual satisfaction to be gained from a given change and the cost of the change. A more theoretical procedure to predict contribution to mutual satisfaction will now be discussed and then followed by a more practical approximation.

Assigning Value to Society's Needs

In order to assess the satisfaction derived by society from changes which attempt to meet their demands relative to work, value must be assigned to the changes. Operationally, value means the units of satisfaction derived from the change. In economic jargon, units of satisfaction are often referred to as "utils" (derived from utility). In this report, "util" will be used to refer to one unit of satisfaction.

The task assigned to society is to specify the utils it will get if its needs are fulfilled. A simple example will be used to explain the process. Lets assume there are three occupations in our world (A, B, C) and that we have two labor market areas (I, II). We can show the number of positions to be filled in each occupation in each labor market area for a particular time period, (these are the dimensions of society's demands in relation to work -- type of occupation, where located, and when to be filled) as a matrix shown in Table 1.

Table 1
Number of Positions for Each Occupation in Labor
Market Areas in Selected Time Period

Labor market area	Occupation			Total
	A	B	C	
I	1	2	3	6
II	4	2	1	7
Total	5	4	4	13

Society must now assign a utility value to each position filled in each occupation in each labor market area. A simplifying (but not necessary) assumption is that the positions in various occupation and labor market areas have equal utility.

Let's further arbitrarily assume that society derives ten utils from a position that is filled in any occupation in any labor market area. In this situation, when all positions are filled in all occupations and labor market areas, society will get zero utils from having more individuals prepared (unless society gets satisfaction from having back-up individuals for some positions). With these assumptions in force, the maximum satisfaction society could derive for a given combination of labor market area and occupation is derived by multiplying the number of positions in labor market area and occupation by ten. Maximum satisfaction is shown in Table 2.

From Table 2 it can be seen that the maximum utility society could derive is 130 utils. Remember, this is a maximum. If any positions were not filled, the maximum would be reduced by 10 utils for each position.

Table 2
Maximum Satisfaction Which Can Be Derived by Society from
Filling Its Needs in Selected Time Period

Labor market area	Occupation			Total
	A	B	C	
I	10	20	30	60
II	40	20	10	70
Total	50	40	40	130

Assigning Value to Individual's Needs

As was the case for society's needs, the individuals' needs must also be given value if one is to assess any accomplishments. Explicitly, the individual must assign value to filling a position in an occupation in a labor market area at a particular time period (the dimensions of an individual's demands are the same as society's). The value will be in terms of the satisfaction the individual would derive from filling the position. Value will again be measured in terms of utils. Given information about society's needs, the individual must place value on particular occupations in particular labor market areas at a given time.

For the individual, it is not as logical to assume that equal utility will be given to each occupation or labor market area. The individual probably has preferences relative to occupations and labor market areas. An appropriate way for him/her to start might be to assign his/her present position (if he/she is working) or his/her expected position (if he/she is preparing for work) a value of 10 utils. Using this as a base, the individual can assign utility to the other positions in other occupations and/or labor market areas. An example value assignment for a particular individual might be as shown in Table 3.

Table 3
Maximum Satisfaction Which Can Be Derived by Individual
from Filling Needs in Selected Time Period

Labor market area	Occupation		
	A	B	C
I	6	8	11
II	8	10 ^a	14

^aThis is present position held by selected individual

A table of this form could be made for each individual in the population. (It may be that individuals with similar needs could be grouped and treated as a group for planning purposes).

Determining Present Level of Mutual Satisfaction

Present level of mutual satisfaction in the work role could be obtained by summing society's satisfaction for each position filled and

individuals' satisfaction for each position filled or being prepared for. From the individual used in the previous example, society would get ten utils and the individual would get ten utils making a mutual satisfaction level of 20 utils. This process could be continued for every position which is filled and every individual in a position or preparing for a position. The total sum would constitute an indicator of present level of mutual satisfaction.

Determining "Should Be" Level of Mutual Satisfaction

The "should be" level can also be established from the values given various positions by society and individuals. First an analysis would be made which places all individuals in the position which gives them the highest level of satisfaction. In the case where not enough positions exist at a given time for an occupation in a labor market area, individuals are given their second highest choice and so on. Three situations can result. First, all positions are filled and all individuals have a position. In this case supply equals demand although everybody may not have his or her highest valued position. (In the case where individuals do not have their first choice -- there is a potential for additional satisfaction.) Second, all individuals have a position but all positions are not filled. In this situation society is not reaching its maximum level of satisfaction. Somehow, more individuals have to be attracted into work roles. The third situation is where all positions are filled but some individuals who want positions do not have positions. In this case, the individuals have not reached their maximum level of satisfaction and society may actually associate negative satisfaction with unemployed persons. The action needed is job development (change existing positions or add positions) if maximum mutual satisfaction is to result.

Ultimate maximum mutual satisfaction (should be) can be assessed by summing the values associated with positions by individuals and society in a situation when supply would equal demand and all individuals have their first choice positions. However, since vocational education only has impact on individuals it should not be responsible for loss of satisfaction which occurs because all individuals do not have a position and further a position of first choice. (A review of the process of assessing mutual satisfaction will indicate that the largest gains in mutual satisfaction

will be produced by first filling positions which are demanded by society). Therefore, for vocational education, maximum mutual satisfaction is the summation of individual and society values associated with positions for: (1) all positions society needs filled (it is assumed that each position society needs is a highest choice for somebody) and (2) all individuals for highest valued positions. In the example cited previously, the maximum mutual satisfaction would occur if the individual had a position (valued at 10 utils by society) and that the position in time X was occupation C in labor market II (valued at 14 utils by the individual). In this example, maximum mutual satisfaction derived from this individual and society in the specified work role would be 24 utils. Note that if the individual has his/her second choice, because enough positions of his first choice did not exist, the level of mutual satisfaction would be 10 plus 11 or 21 utils.

Defining Alternative Changes to Get From "What Is" to "What Should Be"

A comparison of individuals and society satisfaction under present status and "should be" identifies the changes which can be made to move from "what is" to "what should be." In the example, the level of mutual satisfaction can be increased from 20 (present level) to 24 (what should be) by providing the individual the ability to move from occupation B to occupation C in labor market area II. The value of this alternative change is four utils. A similar calculation could be made for all individuals and positions.

Cost of Alternative Changes

In order to implement a strategy calling for making those changes which result in greatest contribution to mutual satisfaction of individual and society per unit of cost, the cost of alternative changes must be assessed. In the example, a price must be placed on the effort required to move the individual from occupation B to occupation C. Using this price, an amount of increase in mutual satisfaction per unit of cost can be calculated if the prescribed change is made for the individual in question. In this way, similar calculations can be made for all other individuals and positions. The resulting array of alternative changes referenced by an amount of contribution to mutual satisfaction per unit of cost form the alternative actions upon which to implement the proposed strategy for planning vocational education programs.

OPERATIONAL STRATEGY FOR PLANNING VOCATIONAL EDUCATION

The strategy discussed in hypothetical terms in the previous section will be described in more operational terms in this section. The decisions made in planning vocational education programs involve deciding what programs should be offered (e.g., auto mechanics, clerical), how many programs should be offered (e.g., one, ten) for what purpose the program should be designed (e.g., prepare for first job, update), what institutions should offer the program (e.g., high schools, post-secondary institutes), where should the program be located (e.g., Alexandria, Wells), and when the program should be added or deleted (e.g., September, 1982, January, 1990). In addition to describing the content of the decisions (e.g., what, when), the decisions also have a context. Context refers to the environment in which the decision is made and is on a continuum from the theoretically possible to what is practical at a point in time and place.

Very Long Run Planning

For the purposes of this report, the contexts are divided into could (the very long run), should (the long run), and would (the short run). "Could" represents those alternatives which are theoretically possible under existing legal constraints and cultural values. For example, vocational education could have education programs for commercial airplane pilots or rock musicians. In deciding what could be done, reference is made to legal constraints (e.g., no program for occupations requiring a baccalaureate degree for entry) and existing cultural values (e.g., no program for thieves). Decisions in the context of what "could be" are important in ascertaining the full scope of things which could be done. They identify growing and receding points for vocational education. As has been demonstrated in the past, the "could be" changes with changes in legislation (e.g., distributive and business and office occupations were added long after agriculture and home economics) and existing cultural values (e.g., energy technician has recently become a viable occupation, females accepted and sought after in traditionally male occupation). A framework for tackling decisions in the "could" context is shown in Figure 13. The difference between what "could be" and what "is" forms the basis for a "very long run" plan.

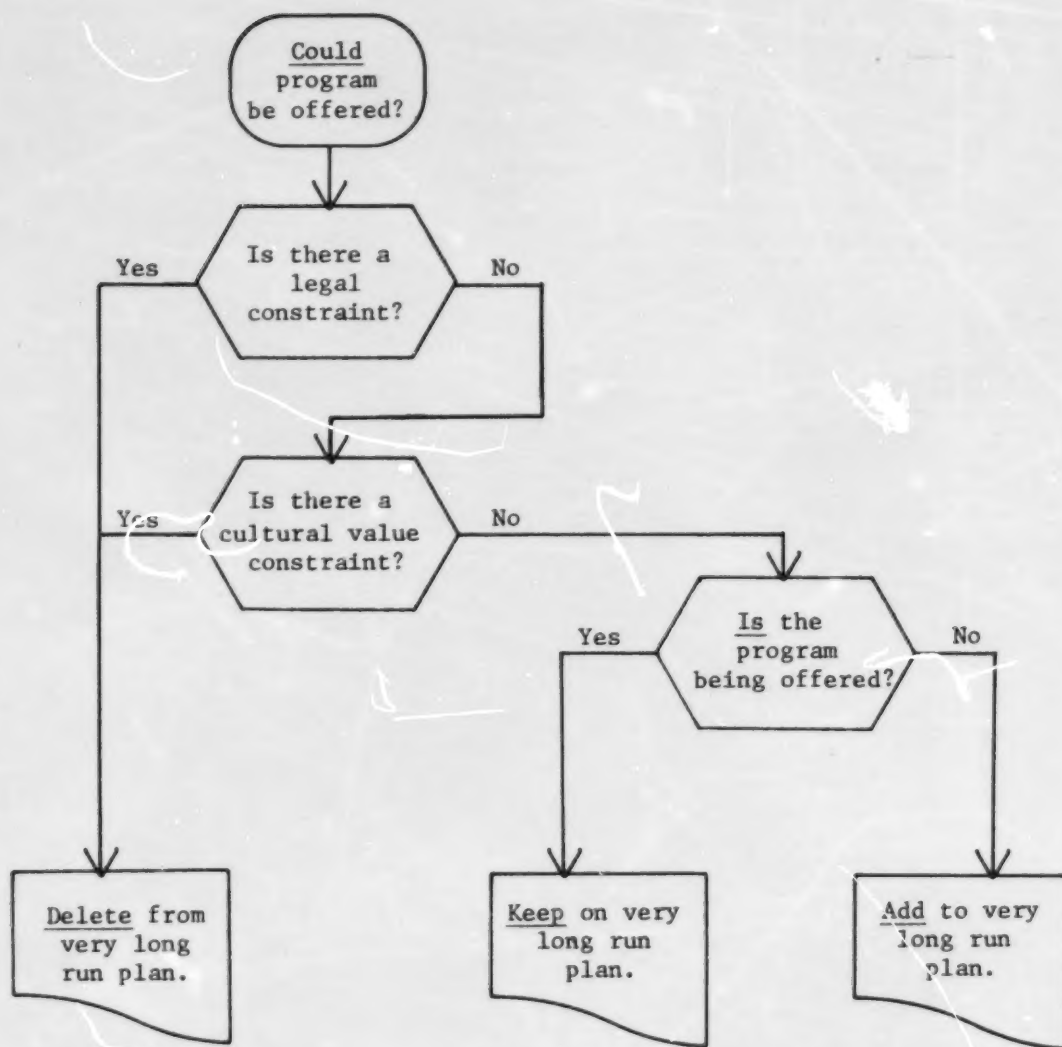


Figure 13. Strategy for determining very long run plan.

Long Run Planning

Decisions made in the "should" context refer to what is theoretically best in the long run. Decisions are not constrained by present resources (e.g., annual budget, physical plant, staff) since these resources can be changed in the long run. Rather, the emphasis is on determining the amount of mutual satisfaction (for individual and society) which can be generated by various alternative program offerings and the effectiveness and efficiency of other sources of education for selected occupations (e.g., private schools, on-the-job, apprenticeship).

In making "should be" decisions, the expected contribution to the mutual satisfaction of individual and society of providing preparation for a particular occupation must first be ascertained. An approximation to the more theoretical process of assessing potential satisfaction associated with training for various occupations proposed in the previous section of this chapter is to handle the matter in two steps. First, one should raise the question of potential contribution to individual satisfaction. This might be done by determining if there is a fairly stable interest among individuals for training for each occupation. Determination could be done in a wide variety of ways (e.g., interest surveys, results of formal interest assessments, examining number of student program applications). The concern here is to establish that there will be a future interest in training for the occupation. The assumption is that if there is interest, there is also the aptitude to perform the occupation and there will be satisfaction with being prepared for the occupation.

The second step in determining potential for satisfaction is to focus on the needs of society. The question to be raised here concerns the future occupational demand for each occupation. Answers to this question can again be obtained through a variety means (e.g., analysis of labor market projections, review of past trends in the placement of those leaving training programs). The assumption made is that if there is occupational demand, society will derive satisfaction from having the demand filled. It may also be possible to get some sense of the relative amount of satisfaction society would derive among occupations by examining indicators such as the wages or salary (or income saving) which accompanies the demand schedules.

The other criteria mentioned in reference to the "should" is the effectiveness and efficiency of alternative sources of education for a

selected occupation. The variables of importance are: (1) Are there other sources of education available for the occupation, (2) are the sources effective in the education provided, (3) are the sources accessible in terms of location, time, cost, allowance for special needs (e.g., handicapped, disadvantaged), (4) do the sources prepare enough individuals, and (5) are they more efficient (i.e., cost less to individual and society) given an affirmative answer to the previous four questions.

Other sources of education for a particular occupation might be so called "general" or "academic" education or alternative forms of vocational education such as private vocational schools, apprenticeship programs, on-the-job training sponsored by industry, training programs sponsored under the Comprehensive Employment and Training Act (CETA) and other sources which represent alternatives to vocational education sponsored through public schools. The division of alternative sources is not always "neat" since many programs may be done cooperatively (e.g., high school vocational education courses are taken along with more "general" education courses, apprenticeship classroom training is often done in public sponsored vocational education programs). If there are not alternative training sources to vocational education, society might well ask the question -- should there be alternative competing sources as opposed to a monopoly by public vocational education programs for the best interests of individuals and society.

The effectiveness of alternative sources refers to their ability to gain for the individual they serve and society the maximum mutual satisfaction possible in the work world. Given that the purpose of the program is to give specialized training for a first job, effectiveness means that after completing the program, an individual has the ability to perform in the selected occupation at a level acceptable for occupational entry. Effectiveness can be stated in terms of the competencies which the program develops and the level of performance in the competencies guaranteed to its clients. Additional indexes of effectiveness may be the percent of individuals completing a program who are first able to get an occupation of the kind for which education was provided and the degree of satisfaction of the individual with the occupation and the satisfactoriness of the employers with the performance of the individual. A further removed indicator of effectiveness may be the ability of the individual to advance or become promoted in the selected occupational area.

The accessibility of alternative sources of education refers to the degree to which they are "open" or can be "taken advantage of" by all individuals irrespective of age, sex, geographic location, race, economic status, physical condition, family status, and timing of availability (e.g., some individual may be able to participate in training only during the weekends or evenings). Accessibility is closely tied to the provision for equal educational opportunity.

The volume of individuals served is another dimension of the question concerning the viable alternative sources of education for a given occupation. Volume refers to the number of individuals served relative to occupational demand by society.

The dimension of efficiency is applied last. If there are alternative sources of training for an occupation and they are effective, accessible, and have sufficient capacity then the question of cost (to society and individual) can be raised in deciding if vocational education should provide training. If there are alternative sources, but they are not effective or not accessible or not of sufficient capacity, then vocational education may decide it should provide training without even asking the cost question. In calculating cost, both the cost to individual and society must be assessed and added together to provide an estimate of total cost per individual with given level of competence and specified competencies relative to a selected occupation.

Making decisions concerning planning vocational education in the "should" context, therefore, involves questions of contribution to mutual satisfaction of individual and society and viability of alternative sources of education. Each of these questions can be subdivided into several more specific questions. A framework for making decisions in the "should" context is proposed in Figure 14. The difference between "should" and "is" represents the basis for a long range plan.

Short Run Planning

Decision in the "would" context refer to what can be done in the short run given the consideration of previously stated concerns plus existing resource limitations, potentially interested students and prevailing cultural values. Decisions are constrained by resources (e.g., teachers under contract, facilities, curriculum), number and type of students enrolled or

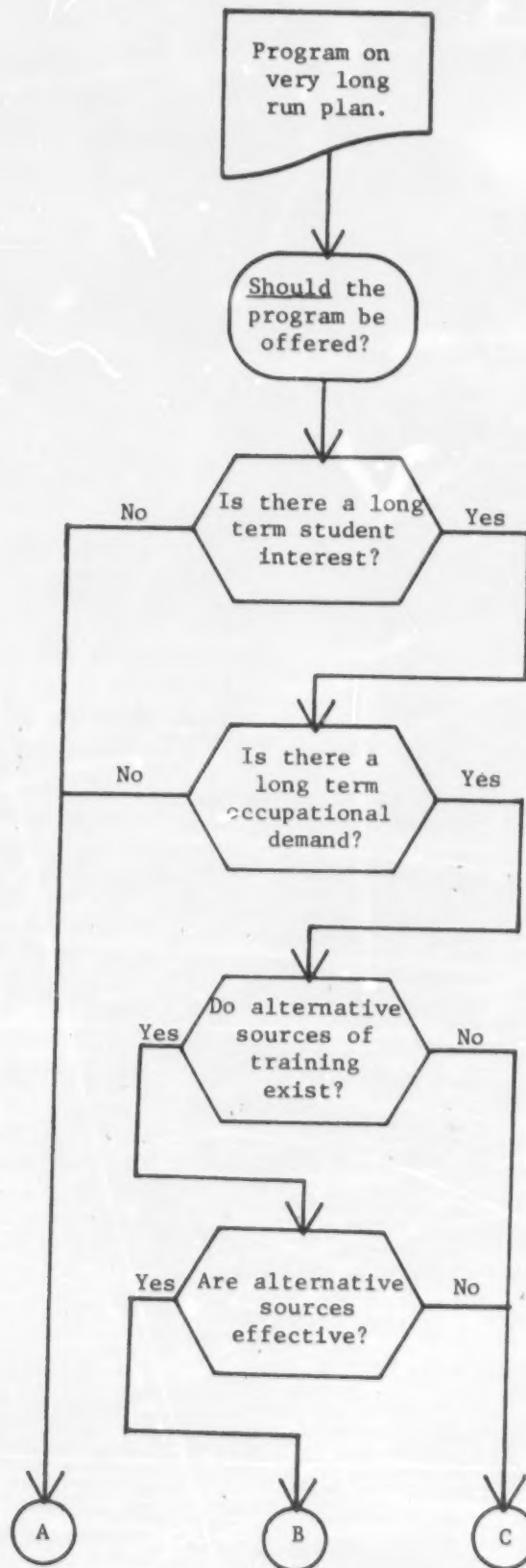


Figure 14. Strategy for determining long run plan.

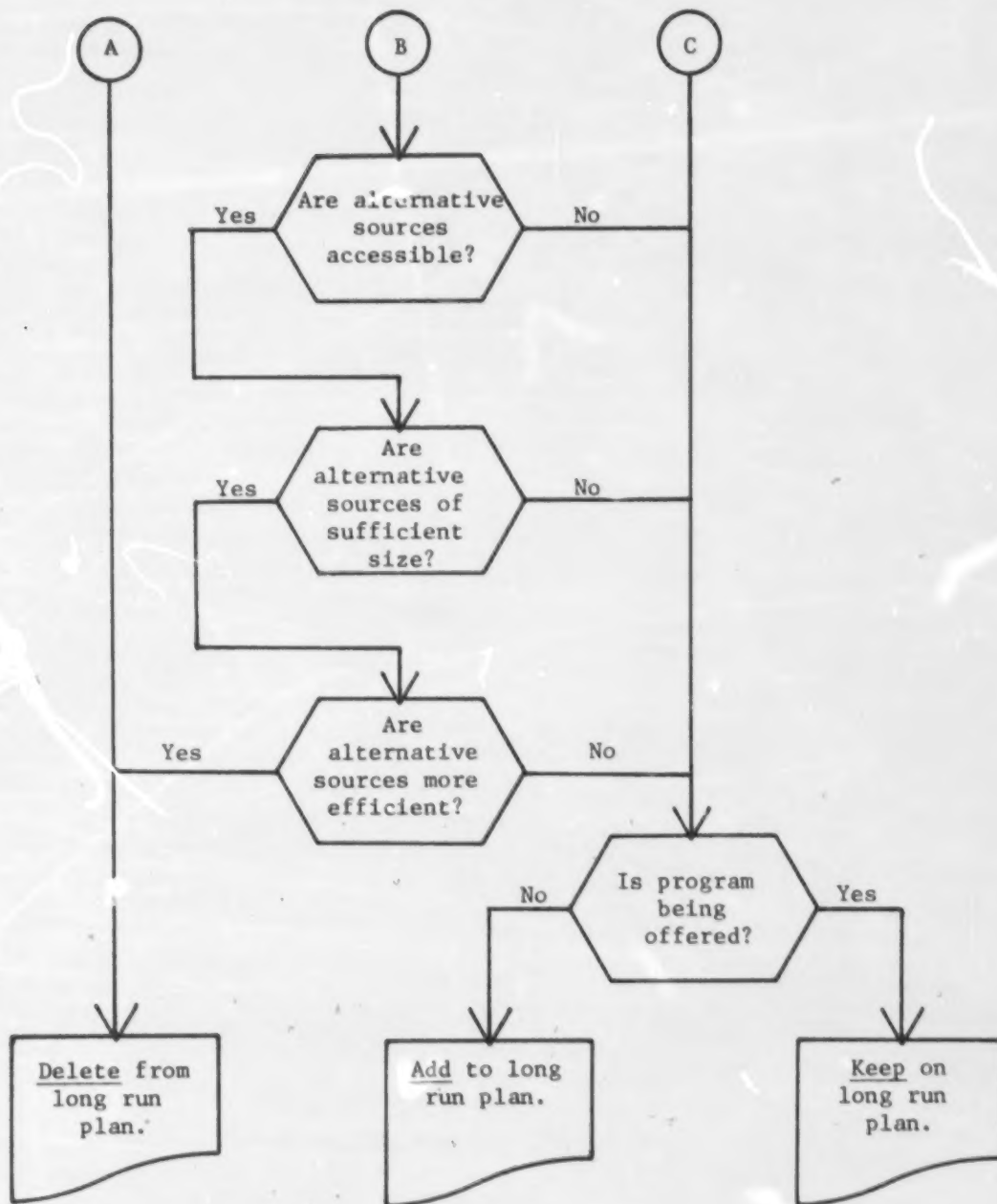


Figure 14 (Cont.). Strategy for determining long run plan.

willing to enroll and existing community values (e.g., political, social). Decisions become very realistic at this point, reflecting things that will be done tomorrow. Decisions are complicated by the many factors which now must be considered -- not only the factors going into the long run plan, but the additional factors cited above. The most important concerns become:

1. Facilities (e.g., shop equipment, laboratories, training stations, capacity, utilization)
2. Teachers (e.g., tenured, salaries, experience)
3. Students (e.g., number interested, enrollments, attendance, completion, ages)
4. Jobs (e.g., vacancies, pay, cooperative placements stations, previous graduate placement rates)
5. Political environment (e.g., taxpayer, parent, teacher, student)
6. Budgets (e.g., size, capital outlay, operating expenses)
7. Curriculum (e.g., effectiveness, availability, flexibility)

These are the variables which become relevant to the short run plan as shown in Figure 15.

SUMMARY

This chapter has presented a theoretical and more operational strategy for planning vocational education. Using the theoretical strategy, the planning goal was to implement those programs which resulted in the greatest contribution to mutual satisfaction of individual and society per unit of cost. An analytical framework was described which could be used to identify contribution to mutual satisfaction of alternative programs.

The more operational approach to planning was done in three different contexts: 1) what could be done (very long run), 2) what should be done (long run, and 3) what would be done (short run). Planning of vocational education in the "could" context was constrained by legal and cultural value considerations. In the "should" context, the additional concerns were contribution to mutual satisfaction and alternative sources of education including both general education and other sources of vocational education. An operational approach to assessing mutual satisfaction was proposed. In

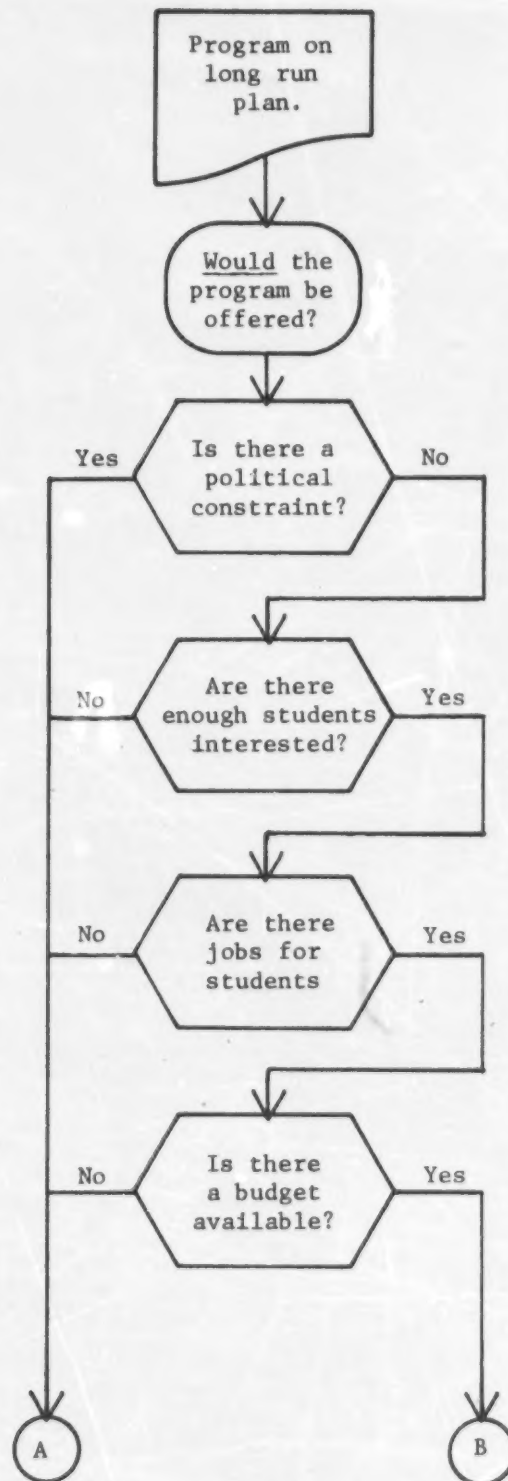


Figure 15. Strategy for determining short run plan.

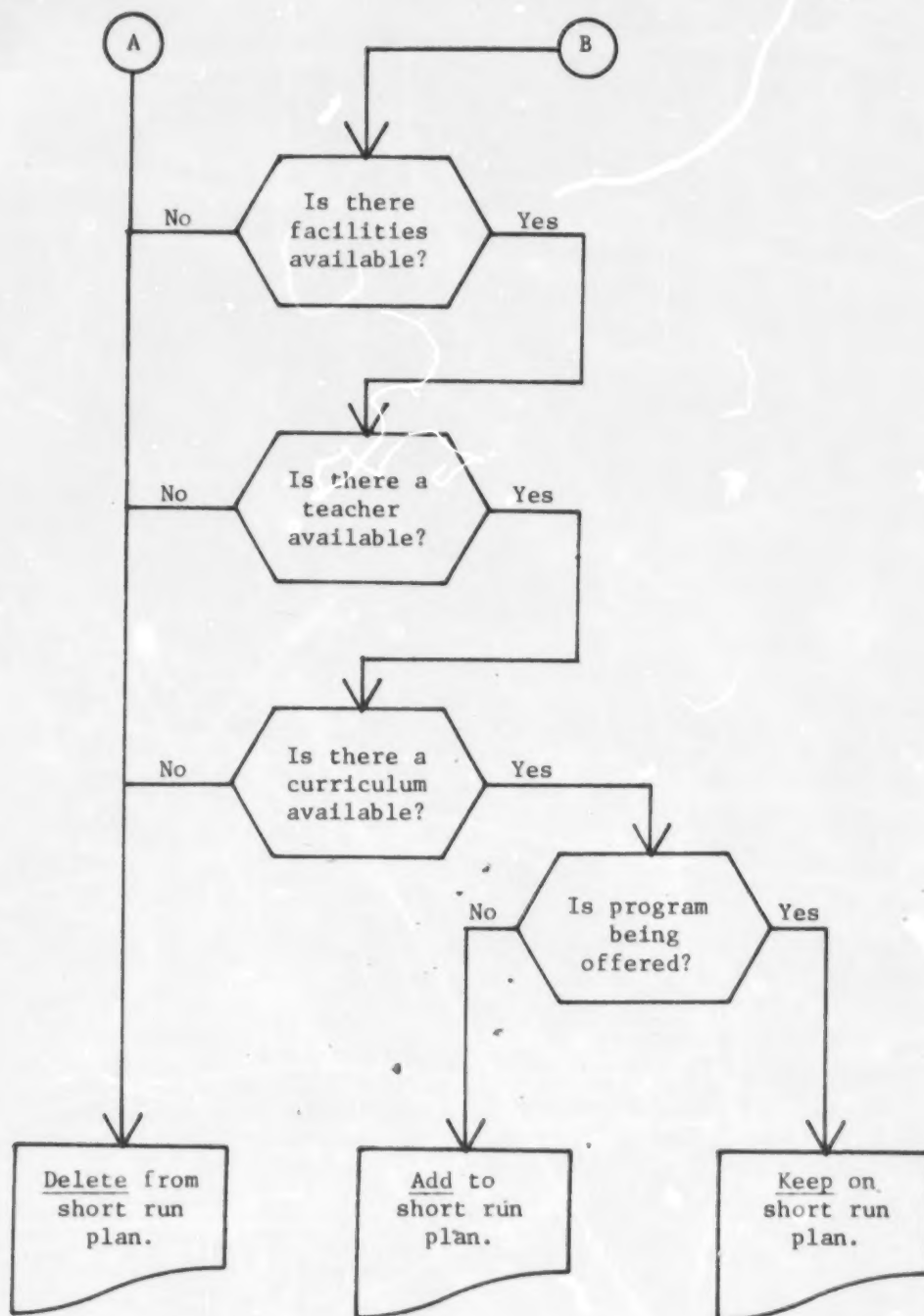


Figure 15 (Cont.). Strategy for determining short run plan.

the "should" context, resource limitations were not a constraint. The "would" context dealt with planning in short run where resources are limited and the political environment is of concern.

In all of the more operational "contexts", the differences between what could, should, and would be done and what is, form the basis for a very long run, long run and short run plan, respectively. To return to the analogy of a plan to a road map, in all of the above contexts, the planning strategy identified present location and destination (i.e., what is and what could, should, and would be). The questions asked in arriving at could, should, and would identify the intermediate points which must be passed through satisfactorily when moving from present location (what is) to a given destination (what could, should, or would be). In some cases, the intermediate points are easy to reach (e.g., facilities may be easily available for a program), but for others the road may be difficult (e.g., securing a teacher with particular qualifications).

The previous chapter provided the vocational education planner (travel agent) with a model (road map) of vocational education. This chapter has provided the means to use the model (layout routes) so as to provide vocational education programs (services) which maximize mutual satisfaction of individual and society in an efficient manner (customer satisfaction).

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